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Female representation among editorial boards of social, clinical, and educational pharmacy journals

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ABSTRACT

Background: Recent studies on editorial team members of healthcare journals have been showing disparities in this distribution. However, there are limited data with respect to pharmacy journals. Thus, the aim of this study was to investigate the distribution of women among editorial board members of social, clinical, and educational pharmacy research journals around the globe.
Methods: A cross-sectional study was conducted between September and October 2022. Data were extracted from Scimago Journal & Country Rank and Clarivate Analytics Web of Science Journal Citation Reports The top 10 journals in each region of the world (continents) were analyzed. Editorial board members were categorized into four groups and determined based on information available on the journal's website. The sex was classified in binary form through name and photography, the personal and institutional web pages, or the Genderize program.
Results: A total of 45 journals were identified in the databases, of which 42 of them were analyzed. We identified 1482 editorial board members with only 527 (35.6%) being female. Analyzing the subgroups, there were 47 total editors-in-chief, 44 total co-editors, 272 associate editors, and 1119 editorial advisors. Of these, 10 (21.27%), 21 (47.72%), 115 (42.27%), and 381 (34.04%) were female, respectively. Only 9 journals (21.42%) presented more females among their editorial board members.
Conclusion: A notable sex disparity among social, clinical, and educational pharmacy journals' editorial board members was identified. Efforts should be made to involve more female sex in their editorial teams.

1. Introduction

For centuries, society has called out for transformations to guarantee the fundamental human rights of their members.[1] Gender equality is the equal valuing of rights, responsibilities, and opportunities by society between men and women.[2] The first recognized gender equality expression was released in 1791 by the French playwright and political activist Olympe de Gouges on the Declaration of the Rights of Woman and of the Female Citizen.[3] In 1948, the United Nations General Assembly recognized the equality of men and women through the Universal Declaration of Human Rights.[4]

Despite the progress and advances that have been made in the past century and the progressive agenda promoting health and well-being for all, including gender minorities,[5,6] gender inequality remains one of the foremost challenges in modern societies, given the significant disparities in pay-based salaries, social norms and practices, education, political participation, and social institutions.[5] According to the Global Gender Gap Report 2022 published by World Economic Forum, the average distance completed to global gender parity is at 68.1%; the "Political Empowerment" criteria is one of the lowest (22%), followed by "Economic Participation and Opportunity" criteria (60.3%). On the other hand, the "Educational Attainment" and "Health and Survival" criteria achieved an average distance of 94.4% and 95.8%, respectively, although the progress is proceeding slowly.[7]

These findings are also reflected in the healthcare workforce. Although the World Health Organization states that there has been progress in advancing the representation of women in the highest-paying health occupations since 2000, there is still an average gender

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pay gap in the health workforce of 28%.[8] In the pharmacy area, a report published by International Pharmaceutical Federation showed that although women make up the majority of the global pharmaceutical workforce (expected to increase to around 72% by 2030),[9] they are underrepresented in decision-making roles, whether in pharmacy leadership,[10] academic pharmacy,[11] or scientific research in pharmacy.[12]

Recent studies have been published on the sex or gender distribution of editorial team members of healthcare journals and all of them showed disparities in this distribution.[13–17] Yet, the research on female representation in the editorial board composition in pharmacy journals is still limited.[13,18,19] Thus, the aim of this study was to investigate the distribution of women among editorial board members of social, clinical, and educational pharmacy research journals around the globe.

2. Methods

A cross-sectional study was conducted between September and October 2022 to evaluate the sex distribution among editorial board members of social, clinical, and educational pharmacy journals.

The inclusion criteria were journals that published articles related to the area of the pharmaceutical sciences, specifically in social, clinical, and educational pharmacy research, without language restriction. Journals that published solely studies of basic sciences related to the pharmacy (e.g., drug discovery, pharmacology, microbiology, toxicology) or not associated with the areas of the inclusion criteria and journals that did not present any information about the editorial board were excluded.

Data were extracted from Scimago Journal & Country Rank (https://www.scimagojr.com/) and Clarivate Analytics Web of Science Journal Citation Reports (https://jcr.clarivate.com/jcr/home). The following indexing categories were used to identify the journals: *Pharmacy, Pharmaceutical Science, and Pharmacology, Toxicology and Pharmaceutics (miscellaneous)*, *Pharmacology and Pharmacy, Medicine (General and Internal), Healthcare Sciences and Services, Public, Environment, and Occupational Health, and Education (Scientific Disciplines)*. Moreover, the filter *Region* was used to investigate all journals of the world indexed in both databases. The journals were ranked according to the 2021 Scientific Journal Rankings (SJR), 2021 Journal Impact Factor (JIF), and CiteScore. The top 10 journals in each region of the world (continents) were analyzed. Journals found in both databases were preferably included.

Editorial board members were categorized into four groups (editor-in-chief, co-editor, associate editor, and editorial advisory) and determined based on information available on the journal's website and the role of each member. The sex was classified in binary form (female and male) through name and photography. When this information was not available on the journal website, the personal and institutional web pages, ORCID, Google Scholar, or ResearchGate of the member were consulted. Moreover, a website that predicts the gender of a person by name (https://genderize.io/) considering a cut-off of 85.0% was used when the previous methods were not conclusive. Two investigators independently (GSM and TML) evaluated the editorial board members and any disagreements were resolved by consensus.

Other data such as journal profile, country, SCImago Journal Rank (SJR) indicator with the best quartile, CiteScore by Scopus, 2021 JIF, language, and type of journal's policy were extracted by two investigators (GSM and TML). The characteristics of the journals were descriptively summarized as a narrative synthesis, using structured tables.

We used descriptive statistics to explore the characteristics of the included journals. Analyses were performed in the SPSS program, version 25 (IBM, Armonk, NY, USA).

3. Results

A total of 45 journals were identified in the databases. However, three journals (*Latin American Journal of Pharmacy*, *SA Pharmaceutical Journal*, and *Australian Journal of Pharmacy*) did not present any information about editorial board members on their websites and were excluded. Thus, 42 journals were analyzed. It is important to note that the Latin American, Africa, and Oceania regions did not achieve the top 10 journals (only four each). Forty journals (95.2%) were included in Scimago Journal & Country Rank. The mean SJR indicator was 0.39 (SD = 0.23 [range 0.0–1.8]), most journals were in quartile Q2 (n = 14, 33.3%) followed by Q1 (n = 13; 31.0%) and were categorized as "Pharmacy" (n = 18; 42.9%). Only 22 (52.4%) journals were included in Clarivate Analytics Web of Science Journal Citation Reports. The mean of JIF was 2.48 (SD = 1.90 [range 0.54–9.29]), being most journals classified as "Pharmacology and Pharmacy" (n = 32; 76.2%). Forty journals (95.2%) presented the CiteScore, with a mean of 3.50 (SD = 5.90 [range 0.0–37.0]).

Thirty-nine (92.9%) journals were published only in English, two (4.7%) in two languages (English and Spanish or French), and one journal (2.4%) was published only in Spanish. For the publication model, most journals (52.4%) are open-access and apply a publication fee to papers accepted after peer review, eleven journals (26.2%) are subscription and give a publication fee option (hybrid), eight journals (19.0%) are open-access and completely free for publication, and one journal (2.4%) does not make it clear this process. Descriptive statistics and the characteristics of the journals included in this study are shown in

Table 1
Characteristics of the journals included in this study (n = 42).

Characteristics	N (mean)	% (SD)
Journal profile		
General	20	47.6
Specialized	22	52.4
Country		
United States of America	8	19
United Kingdom	3	7.1
New Zealand	3	7.1
Iran	3	7.1
Other[a]	25	59.7
SJR quartile		
Q1	13	31
Q2	14	33.3
Q3	10	23..8
Q4	2	4.8
NA	3	7.1
SJR category		
Pharmacy	18	42.9
Pharmaceutical Science	15	35.7
Other[b]	9	21.4
SJR indicator	(0.39)	(SD = 0.23 [range 0.0–1.8])
JIF category		
Pharmacology and Pharmacy	32	76.2
Other[c]	10	23.8
JIF (2021)	(2.48)	(SD = 1.90 [range 0.54–9.29])
CiteScore	(3.50)	(SD = 5.90 [range 0.0–37.0])
Language		
English	39	92.9
Other[d]	3	7.1
Publication model		
OA without publication fee	8	19.0
OA with publication fee	22	52.4
Hybrid	11	26.2
NR	1	2.4

OA (Open-access), JIF (Journal Impact Factor), NA (Not Applicable), SD (Standard Deviation), SJR (Scientific Journal Rankings), NR (Not related).

[a] Brazil, Chile, Cuba, Nigeria, Egypt, Australia, Saudi Arabia, China, India, Japan, Indonesian, Canada, Netherlands, Spain, Croatia, Belgium, Bulgaria, and Poland.

[b] Pharmacology, Toxicology and Pharmaceutics (miscellaneous), Drug Discovery, and Medicine (miscellaneous).

[c] Medicine (General and Internal), Healthcare Sciences and Services, Chemistry, medicinal, Public, Environment, and Occupational Health, Education, and Scientific Disciplines.

[d] English and Spanish, English and French, and Spanish.

Table 1 and Appendix 1, respectively.

We identified 1482 editorial board members with only 527 (35.6%) being female. Analyzing the subgroups, there were 47 editors-in-chief, 44 total co-editors, 272 associate editors, and 1119 editorial advisors. Of these, 10 (21.27%), 21 (47.72%), 115 (42.27%), and 381 (34.04%) were female, respectively (Fig. 1a). Moreover, only 9 journals (21.42%; *Revista Cubana de Farmacia, Revista de Ciencias Farmaceuticas Basica e Aplicada; American Journal of Pharmaceutical Education, Research in Social and Administrative Pharmacy, Currents in Pharmacy Teaching and Learning, American Journal of Health-System Pharmacy, Hospital Pharmacy, Acta Pharmaceutica,* and *Pharmacy Education*) presented more females among their editorial board members (Fig. 1b); of these, five U.S. journals. The discrepancy of sex distribution among editorial board members was different according to the geographical regions. Oceania region showed lower female participation (n = 18, 19.35%), followed by Asia (n = 103, 20.47%), Africa (n = 27, 31.03%), North America (n = 169, 46.42%), Europe (n = 165, 47.96%), and Latin America (n = 45, 49.45%). Moreover, the proportion of female members in editorial teams was lower compared to the estimated proportion of females per region[9] (Table 2). The data of editorial board members are shown in Appendix 2.

4. Discussion

To the best of our knowledge, this is the first study regarding female representation among editorial boards of social, clinical, and educational pharmacy journals around the globe. Forty-two journals were included; most of them published articles solely in social, clinical, and educational pharmacy practice, in the English language, with correspondence in the U.S. region, and open-access with article processing charges. Our results demonstrated significant discrepancies in sex distribution among editorial board members in these journals, which aligns with previously published studies in Pharmacy. In 2012, Dotson et al., by analyzing six pharmacy journals, found that editorial board members were more likely to be male than female (60% versus 40%). Sarna et al. (2020) also reported women as the underrepresented gender among editorial staff in seven pharmacy journals, but authors showed an increase in female representation in this setting over time. Awad (2021) evaluated 20 pharmacy journals and identified only seven of them having editorial boards of at least 50% of females. This scenario is also similar in other science disciplines. An analysis of 143 veterinary journals reported that females were underrepresented in the group of managing editors (32.2% vs. 67.2% of males), editors (34.5% vs. 65.1%), and other staff (33.3% vs. 65.4%).[20] Yet, the authors found that JIF did not have a significant impact on the proportion of males vs. females on the editorial board in this field. In healthcare, studies reported even lower participation of females in editorial boards, ranging from 12.7% in emergency medicine to 14.8% in dentistry journals and 17.5% in top-ranking medical journals (of which only 15.9% were positioned as editors in chief).[21–23] Nonetheless, a recent 10-year analysis of the representation of females in editor-in-chief and editorial board member positions in medical journals between 2011 and 2021 showed increases of 8.5% and 10.4%, respectively. Moreover, journals with female editors-in-chief significantly gained 3.5 ranks and 9.1 points in JIF on average during this period compared with no gain in rank ($p = 0.045$) and an increase of 4.7 points in JIF ($p = 0.016$) for journals with male editors-in-chief. We also observed an important percentage of female leading boards of high-quality journals in social, clinical, and educational pharmacy journals, which may reveal a change (although at a slow rate) in these positions and a reduction in gender gaps.[24]

Our study additionally highlighted sex inequality in editorial boards as a common issue across different regions, yet with more significant gaps in Oceania and Asia. Similarly, an analysis of 30 anaesthesia journals in 2020 revealed that only 7% of females on editorial boards were from low-, middle- and upper-middle-income countries.[25] On the other hand, our study found that journals of North and Latin America regions presented more female representation among Editorial board members compared with other regions. One reason for this may be related to a greater proportion of female pharmacists in these regions (around 70%) compared to others, except in Europe.[9]

In fact, according to the Global Gender Gap Report 2022, at the current rate of progress, it is estimated to take around 132 years to reach full parity regarding the current 32% gender gap around the globe; this rate slightly improved compared to 2021 (136 years to parity).[7] While regions such as North America and Europe have closed over 77% of their gender gaps in 2022 (with Iceland, Finland, and Norway holding the topmost ranks in the world), other regions such as Asia, the Pacific, and Africa report lower performances, having closed around 60–65% of the gender gaps in the same year.[7] This may occur, among others, due to the high heterogeneity within regions regarding their political-economic and cultural characteristics that may impact countries' progress. Some of the causes and underlying drivers of overall unsustainability and gender inequality include religious freedom, political representation, societal mindsets, racism, lack of body autonomy and legal protection, and uneven access to education and healthcare. Few countries in the world give women exactly the same legal work rights as men. Because of

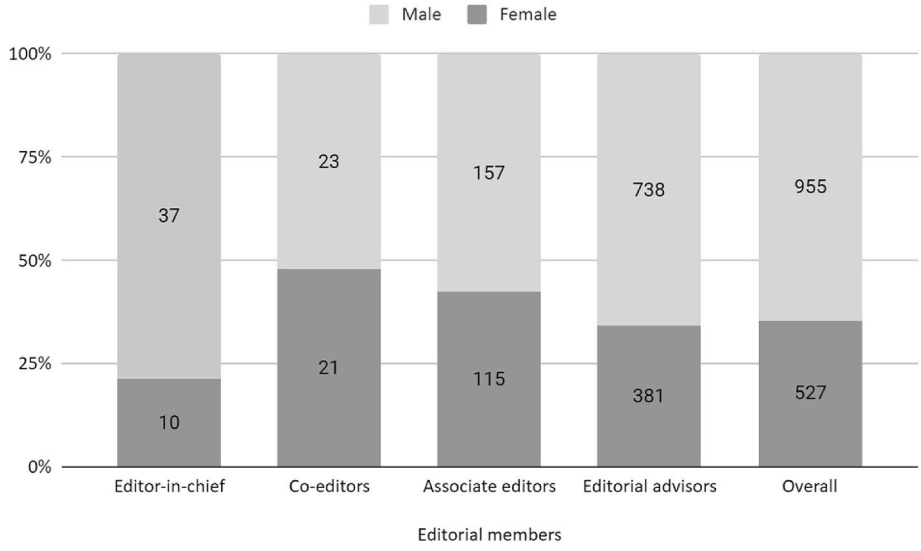

Fig. 1a. Data of all editorial board members of the journals included (n = 1482).

Fig. 1b. Sex distribution among editorial board members of the journals included (n = 42).

Table 2
The discrepancy of sex distribution among editorial board members according to the geographical regions.

Region	Female	Male	Total	% female members	% estimated of females*
Africa	27	60	87	31.03	37.00
Asia	103	400	503	20.47	54.00
Europe	165	179	344	47.96	68.00
Latin America	45	46	91	49.45	68.00
North America	169	195	364	46.42	68.00
Oceania	18	75	93	19.35	61.00

*Source: Bates et al., 2018.

this scenario, women still occupy only about 35% of leadership positions; with a current pay gap among genders of around 20%.[26,27] Besides these overall factors grounding gender disparities, further specific reasons potentially associated with unequal gender representation in editorial boards include differences in publishing and engaging academia, lack of mentorship and female role models, pervasive masculine culture, and work environment.[28,29]

In science, although publication is used as a measure of productivity and is emphasized in the promotion process and career advancement, discrepancies in how men and women engage with the publishing process still exist. A study on 'invited papers' indexed on PubMed found that men are estimated to receive twice as many invitations from journals to submit their work ($p < 0.0001$),[30] while another analysis showed that female first authorship in high-impact medical journals is still low – of only 37%.[31] Other study analyzed 2898 scientific papers published between 1995 and 2017 in which two or more authors shared the first author position and identified that men are more likely to have their name printed first in publications (57.6%) even if both men and women contribute equally to the work (i.e., both listed as first authors), although the disparity decreased over time.[32] Some studies in the health field further indicated that females usually assume more academic/professor responsibilities and spend more time with patients and teaching rather than in research, which may contribute towards these differences among genders' careers.[33,34]

The barriers to workplace equality can additionally result in females 'leaking' from the academic pipeline. The 'leaky pipeline' or 'pipeline phenomenon' is a metaphor often used to describe the progressive reduction in women's participation at the different stages of career progression in STEM (i.e., science, technology, engineering, math).[35,36] Factors that contribute to these imbalances include the glass ceiling metaphor (i.e., barriers resulting from gender or race that prevents one from moving to a certain point in their career) and the glass cliff phenomenon (i.e., women allocated to precarious leadership roles where they are more likely to fail).[37] Moreover, studies show that women in science are more likely than their male counterparts to put an emphasis on life-work balance and to make career sacrifices (including leaving the profession prematurely or working on a part-time basis) – partially due to parental duties.[28,29]

Changes in the working environment including flexible work options, decent workplaces (without discrimination and violence of any type), and family and child-rearing support (including daycare centers, breastfeeding breaks, and paid maternity leaves) may increase the representation of women in some leadership roles. Mentorship and positive role models of women leaders have also been found to be a strong influential factor in keeping females in academia, probably due to the created encouraging work environment or the benefits of regularly scheduled meetings focused on career goals. In fact, this approach may result in retention rates of over 80% of participating women in the field, with participants reporting significantly increased confidence in their academic roles and skills.[38] Moreover, journals can improve the diversity of their editorial boards with actions such as transparency (publishing statistics on their editorial board composition on their website), quantitative targets or quotas for a proportion of the editorial board, and editorial board terms or limiting the number of roles an individual can have on the journal.[39]

This study has some limitations. Given the design of this research, there was no investigation into trends in sex or gender ratios of journal editorial boards over time. Moreover, some journals were missed because they were not indexed in the databases used. Finally, we used only binary sex distribution criteria, excluding gender identities and expressions as well as socially constructed roles, behaviors, and expressions of the people.

5. Conclusion

There is a notable sex disparity among editorial board members in journals that published studies in social, clinical, and educational pharmacy areas. In light of these findings, the editorial teams need to seek to understand the underlying reason better and must create strategies to involve more female sex in their editorial teams in order to achieve gender parity and promote historical mending.

Author statement

Graziela dos Santos Massa: Conceptualization; Formal analysis; Investigation; Writing - Review & Editing; Visualization. **Fernanda Stumpf Tonin**: Investigation; Writing - Original Draft; Writing - Review & Editing; Visualization. **Tácio de Mendonça Lima**: Conceptualization; Methodology; Software; Formal analysis; Investigation; Writing - Original Draft; Writing - Review & Editing; Visualization; Supervision; Project administration.

Declaration of competing interest

The authors have no conflicts of interest to declare. All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.sapharm.2023.02.018.

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